

ASTR101: General Astronomy

Sections 0101-0110, Fall 2022



Prof: [Doug Hamilton](#)

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(Always put "ASTR101" in your email subject line)

Office: PSC 1153

Office Hours: TuTh 12:30-2:00 or by Appt.

Recommended Class Textbook: *The Cosmic Perspective Fundamentals*, by Bennett, Dohahue, Schneider, Voit. You can get the new [third edition](#) (about \$90) [the second edition](#) (<\$25), or even the [first edition](#) (so cheap!), your choice. All you need is the hardcopy textbook. This is the shortest Astro book on the market, and I recommend that you to read it cover to cover over the course of the semester! A free alternative textbook is also available as a PDF from openstax at <https://openstax.org/details/books/astronomy>.



Class Web Page: <http://www.astro.umd.edu/~hamilton/ASTR101/>. Packed full with course information, supplementary readings, and interactive programs to make ASTR101 fun and to help you learn. Follow astronomy in the news and see cool space pictures and movies!

Class Meetings:

Lectures meet in PHYS 1412 on TuTh from 11:00am to 12:15pm. Lectures are led by the professor and will include demonstrations, slides, videos etc.

Discussion Sections and Labs meet in [times listed below](#) starting the week of Sep. 5. Discussion sections and Labs are led by graduate student [Teaching Assistants](#) (TAs). Both weekly meetings provide a smaller and more informal environment for further developing the material taught in class. The TAs will also answer questions about the lectures and reading and will hold review sessions before exams. More details on Section and [Lab Policies](#) will be provided during the first meetings.

Course Description:

Welcome to Astronomy 101! You are about to embark on an ambitious project - to survey our known Universe in one short semester. We hope that you find this course enjoyable and walk away with a better knowledge and understanding of the universe that we live in. With that goal in mind, the course attempts to focus on major concepts in astronomy and where possible tie those concepts into issues relevant to your life. For example, global warming, an important worldwide issue, is also central to understanding the differences between the environments of Venus, Mars, and Earth. At a more philosophical level, understanding how our

universe works and how planets, stars, and galaxies are formed gives us a better perspective on our place in the universe and how special planet Earth is to our continued survival.

Most of you have chosen this course to fulfill your science requirement (see [GENED Requirements](#) below). GENED courses are designed to ensure that you will take a look at several different academic disciplines and the way they create and analyze knowledge about the world. We will introduce you to ideas and issues that are central to a major intellectual discipline and involve you actively in the learning process. Please take advantage of the opportunities this course offers!

Course Expectations:

Attendance: In order to succeed in this course, I expect you to **attend all lectures, discussion sections, and labs**. This is very important! The material on the homeworks and exams are based upon the material covered in the lectures, the text, discussion sections, and labs. If you have to miss a scheduled class meeting, be sure to look at another student's notes and make sure that you understand what was covered. See me or the teaching assistant if you have questions. There will be times during the semester, in both lectures and sections, when we will ask for written responses to questions. Your written answers will count towards your grade in the class.

Preparation: I expect you to be prepared to work. You will understand the lecture more easily if you preview the reading assignment. A more careful reading is recommended after lecture. You should study your class notes sometime before the next lecture to make sure that everything is clear. I encourage you to ask questions in class, in discussion, in lab, during [office hours](#), and over email.

Study Habits: Study wisely and ask for help if you need it. If you just cram the night before the exam, you probably will not do very well. It is better (and easier) if you keep up with the material on a daily basis. If you have questions, please see me or one of the TAs. We are here to help you learn.

Grading:

I grade on a point scale with different assignments weighted as shown in the table. A description of each of these components is contained in this syllabus.

ASSIGNMENT	Syllabus Cover	Homework	Section	Labs	Exam I	Exam II	Final	Total
POINTS	10	60	80	150	100	100	200	700

Letter grades will be assigned based upon your curved cumulative score. Grades for some discussion sections may be adjusted slightly so that the average grade given by each TA is similar. Here is how your grade will be determined from your point total in the class.

Letter Grade	A	B	C	D	F
Points Needed	630-700	560-629	476-559	385-475	0-384
Percentage	90%-100%	80%-89%	68%-79%	55%-67%	0%-54%

The point scale makes it possible for everyone in the class to do well. For example, if everyone scores above 80% in the course, you would all receive either a B- or better letter grade. I do use +/- modifiers - you will get

a "+" if you are in roughly the upper 1/3 of students with the same letter grade and a "-" if you are in the lower 1/3. I may adjust the number of points required to get a given grade depending on the class averages; however, any adjustment will make it easier to get a given grade, never more difficult. You can my current estimate of your grade from the class ELMS site as the semester progresses.

Top three ways to get a good grade in ASTR101: 1) Attend all ASTR101 meetings, 2) Do all ASTR101 assignments, 3) Read the ASTR101 book. Also important to improve your learning in ASTR101: go over your returned assignments and any solution sets carefully within a day or two of when they are returned to you. If you are unsure about why something was marked wrong or you believe that it was incorrectly marked wrong, please contact your TA promptly. Grading will be reconsidered for only **a reasonable time** after the assignment is returned to you, **typically 7-10 days**.

Midterm Exams

There will be two in-class 75-minute examinations which will be held in PHYS 1412 on Thursday, October 6 and Thursday, November 17. These exams are closed book with no notes, no calculators, and no other electronic devices allowed. You will only be allowed to leave the classroom at a few specified times, and once you leave you cannot return to your exam. Each exam will consist of 25-40 multiple choice questions and three or four essay or problem solving questions. These exams are incremental (i.e., non-cumulative) checkups on how well you have learned the material. The schedule of lectures included in this syllabus shows what material will be covered on each exam. Please bring only a pencil and your ID card to both midterms and the final.

If for whatever reason, the University is *officially* closed on the exam date, the exam date shifts to the next lecture date.

Final Exam

According to University rules, **the final exam for this course will be held on Wednesday Dec. 14 from 8:00 am to 10:00 am in PHYS 1412**. This final exam is cumulative, that is, it will cover *all* material discussed in this course. However, since chapters 10-15, HW 5-6, and labs 10-11 will not be covered by the midterm exams (see Lecture Schedule), *this material will be more heavily weighted*. The final will include multiple choice, essay and problem solving questions with the exact combination to be determined.

This exam is also closed book with no notes and no calculators allowed. Please bring a pencil and your ID card to the final.

Missed Exams

If you are not able to take an exam due to illness or other legitimate reasons (as outlined in the Academic Info section of the schedule of classes) and you wish to take a make-up exam, you must

- 1) contact me by email **before** you miss the regularly-scheduled exam and
- 2) submit a **valid written excuse** for your absence **within one week** after the regularly-scheduled exam.

Exams are Major Scheduled Grading Events and, accordingly, proper documentation will be required if you wish to make up a missed exam. Make-up exams will typically be given within one week after you submit the valid written excuse. The make-up exams will consist entirely of essays, problems, and short answer questions, and may also include oral questions asked by the professor.

If you miss the final exam and have a *valid written* excuse, you must arrange for a make-up final within 48 hours after the scheduled exam. The make-up final, like the make-up midterms, will have **no multiple choice questions**.

Discussion Sections and Labs

Your weekly hour-long discussion section is an integral part of this course. The sections are run by the TAs, with just general guidelines from me; they will normally include preparing you for lab, review of lecture material, presentation of problems and material not covered in lecture, exercises and quizzes etc. These sections serve as a forum to enhance your understanding of the course material. Your TAs are an excellent resource; get to know them and use that resource! Exams and other paperwork will be returned to you by your TA. Please attend all your discussion sections and labs. If for some reason you have to miss one of these meetings, talk to your TA for options for making up the work.

Understanding laboratory techniques and reaching conclusions based on careful observations is a hallmark of scientific inquiry. Your weekly 2-hour lab is an important part of this course that provides you with the opportunity to think like a scientist. Our goal is that you leave ASTR101 at the end of the semester with critical thinking skills that will allow you to better appreciate science in the news and elsewhere that you encounter it. Be sure to attend the discussion section and lab combination for which you registered. The only way to switch sections is through the registrar's office; **unofficial changes are not allowed**. Memorize your section number and put it on everything that you turn in.

Section	Discussion: ATL 2400	Lab: ATL 0254	TA Name
0101	Tu 3:30pm-4:20pm	Tu 5:30pm-7:30pm	Hoony Kang
0102	Tu 3:30pm-4:20pm	W 8:30am-10:30am	Hoony Kang
0103	W 10:00am-10:50am	W 11:00am-1:00pm	Jerome Seebeck
0104	W 10:00am-10:50am	Th 3:30pm-5:30pm	Jerome Seebeck
0105	W 11:00am-11:50am	W 1:00pm-3:00pm	Vicente Villanueva Llanos
0106	W 11:00am-11:50am	Th 8:30am-10:30am	Vicente Villanueva Llanos
0107	W 12:00pm-12:50pm	W 6:00pm-8:00pm	Thanushi Withanage
0108	W 12:00pm-12:50pm	Th 6:00pm-8:00pm	Thanushi Withanage
0109	W 1:00pm-1:50pm	F 9:00am-11:00am	Brian Davenport
0110	W 1:00pm-1:50pm	F 12:00pm-2:00pm	Brian Davenport

Copying from another student's lab - from our class or another - is academic dishonesty and will not be tolerated in this class (see [Academic Integrity](#) below).

Contact Information and Office Hours

The Prof. and the Teaching Assistants all hold office hours that are open to everyone. There is someone available for several hours each day of the week - we are here to help! When contacting us by email, always be sure to put "ASTR101" in the subject line to ensure that your email is not overlooked. If you cannot make office hours because you are feeling ill or for another valid reason, please contact us for Zoom options.

Name	Office	Office Hours	email
Prof. Doug Hamilton	PSC 1153	Tu 12:30pm-2:00pm Th 12:30pm-2:00pm	dphamil @ umd.edu
Samyak Mehta	ATL 1243	M 4:00pm-5:00pm F 1:00pm-2:00pm	smehta17 @ umd.edu
Brian Davenport	ATL 1243	W 9:00am-11:00am	bdav @ umd.edu
Jerome Seebeck	ATL 1243	M 1:00pm-3:00pm	jseebeck @ umd.edu
Vicente Villanueva Llanos	ATL 1243	M 12:00pm-1:00pm Th 3:00pm-4:00pm	vvillanu @ umd.edu
Thanushi Withanage	ATL 1243	F 10:00am-12:00pm	thanushi @ umd.edu
Hoony Kang	PSC 1129	Tu 2:30pm-3:30pm Tu 4:30pm-5:30pm	kangh @ umd.edu

Homeworks

There are a total of six homeworks in this course. All homeworks will be posted and turned in on ELMS. Homework solution sets will also be posted on ELMS.

All homeworks must be typed and turned in at **11:59 pm** on the due date. Homeworks turned in after this will be considered late and docked at least 20%. **Homeworks may not be turned in by email.** If you experience a valid emergency, you must write your TA an email or leave them a voice mail message **before the assignment is due**, telling them why you will be late. Occasionally, you might need to upload a PDF to ELMS. But computer problems are not a valid excuse for being late; just ask a friend or your TA for help if you need it.

Although you may discuss the homework problems with your friends, **the final writeup must be in your own words.** Copying from anyone else's homework, **copying from a website**, copying from the book, copying from another printed or online source, or allowing anyone to copy your homework is academic dishonesty (see [Academic Integrity](#) below) and is unacceptable in this class. If you consult a reference other than the course text, please acknowledge it in your homework - *this includes websites!*

Extra Credit

There are many ways to earn extra credit in this class:

- Attend Class: I will frequently ask questions worth bonus points during lectures.
- Do the Extra Credit questions on each homework assignment.
- Fill out the ASTR101 class evaluation in October.

Please do not ask for other extra credit opportunities.

Special Circumstances

Students with a documented disability should let me know as soon as possible (preferably on the first day of class) so that appropriate academic accommodations can be made.

Academic Integrity

The academic community at the University abides by a Code of Academic Integrity. Acts of academic dishonesty include cheating, fabrication, facilitating academic dishonesty, and plagiarism. Activities including, but not limited to, cheating on exams or quizzes, copying homework answers from a website, a friend or a book, allowing your homework or paper to be copied, and submitting forged excuses for absences are violations of this code. Academic Dishonesty hurts the whole University of Maryland community - if you are aware of an incident in ASTR101, please report it to one of the TAs or me, anonymously if you wish. If we suspect that a serious incident of academic dishonesty has occurred, we will turn the case over to the Student Honor Council to investigate and resolve. If the suspected party is judged 'responsible' for the act(s) of academic dishonesty, the normal sanction is a course grade of 'XF' on the student's academic transcript which denotes failure due to academic dishonesty. This is far worse than an F. More information can be found on the web at <https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-integrity-student-conduct-codes/>; pay particular attention to the links for students. Also, take a look at my [Academic Dishonesty FAQs](#). **We are very serious about this.**

GENED Requirements

ASTR101 is intended for non-science majors and requires no more than a modest, high-school level science and math background. This course satisfies U. Maryland's requirement for a *lab* natural science course. To satisfy the requirement for a *non-lab* natural science course, you might wish to consider ASTR100. Note that **you cannot get credit for both ASTR100 and ASTR101**. Please be sure that you have chosen the correct course.



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ASTR101 LECTURE SCHEDULE

Lecture Date	Lecture Topic	Reading
Tue. Aug. 30	Introduction, The Scale of the Universe	Chapter 1 (OpenStax 1.4-1.7)
Thu. Sep. 1	A Brief History of the Universe	Chapter 1 (OpenStax 1.9)
Tue. Sep. 6	Seasons on Earth	Chapter 2 (OpenStax 4.2); Syllabus Cover Sheet due
Thu. Sep. 8	The Motions of the Moon and Planets	Chapter 2 (OpenStax 4.5, 4.7)
Tue. Sep. 13	Competing Cosmologies	Chapter 3 (OpenStax 2.2, 2.4)
Thu. Sep. 15	Kepler's Laws & The Scientific Method	Chapter 3 (OpenStax 3.1, 3.3)
Tue. Sep. 20	Newton's Laws of Motion	Chapter 4 (OpenStax 7.1); HW#1 due
Thu. Sep. 22	Planetary Formation	Chapter 4 (OpenStax 7.4)
Tue. Sep. 27	Terrestrial Planet Surfaces	Chapter 5 (OpenStax 10.2, 10.4)
Thu. Sep. 29	Terrestrial Planet Atmospheres	Chapter 5 (OpenStax 10.3, 10.5)
Tue. Oct. 4	The Giant Planets	Chapter 6 (OpenStax 11); HW#2 due
Thu. Oct. 6	EXAM I	Chapters 1-5; HW 1-2; Labs 1-4
Tue. Oct. 11	Moons, Asteroids, and Comets	Chapter 6 (OpenStax 12.1, 12.3, 13)
Thu. Oct. 13	Extrasolar Planets	Chapter 7 (OpenStax 21.4, 21.5)
Tue. Oct. 18	Revisiting Planetary Formation	Chapter 7 (OpenStax 21.6)
Thu. Oct. 20	Light and Atomic Physics	Chapter 8 (OpenStax 15.1, 15.2); HW#3 due
Tue. Oct. 25	The Sun	Chapter 8 (OpenStax 17.1-17.3)
Thu. Oct. 27	Other Stars	Chapter 8 (OpenStax 18.1, 18.2, 18.4)
Tue. Nov. 1	A Small Star's Life	Chapter 9 (OpenStax 21.1, 21.2, 22.1)
Thu. Nov. 3	A Big Star's Life	Chapter 9 (OpenStax 22.2, 23.2)
Tue. Nov. 8	White Dwarfs and Neutron Stars	Chapter 10 (OpenStax 23.1, 23.4)
Thu. Nov. 10	Black Holes	Chapter 10 (OpenStax 24.5, 24.6)
Tue. Nov. 15	Our Galaxy and Other Galaxies	Chapter 11 (OpenStax 25.1, 25.2, 26.2); HW#4 due
Thu. Nov. 17	EXAM II	Chapters 6-10; HW 3-4; Labs 5-9
Tue. Nov. 22	Galactic Distances	Chapter 12 (OpenStax 26.4, 26.5)
Thu. Nov. 24	THANKSGIVING!!	
Tue. Nov. 29	The Big Bang Theory	Chapter 13 (OpenStax 29.3, 29.4, 29.6); HW#5 due
Thu. Dec. 1	Dark Matter and Dark Energy	Chapter 14 (OpenStax 28.4, 29.5)
Tue. Dec. 6	Fate of Our Universe	Chapter 14 (OpenStax 28.5, 29.2)
Thu. Dec. 8	Life, the Universe, and Everything	Chapter 15 (OpenStax 30); HW#6 due

Wed. Dec. 14	FINAL EXAM (8:00am-10:00am)	Chapters 1-15; HW 1-6; Labs 1-11
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ASTR101 Discussion and Lab

Lab Policies

Date	Discussion	Lab
Aug. 30 - Sep. 2	First Week of Class!	No Lab or Discussion Meetings this week
Sep. 6 - Sep. 9	Intro to Discussion and Lab	Math in the Solar System
Sep. 13 - Sep. 16	All about the Moon	Moon Phases
Sep. 20 - Sep. 23	Motions on the Sky	Sky Motions in Stellarium
Sep. 27 - Sep. 30	Kepler's Laws, Terrestrial Planets	Planetary Surfaces
Oct. 4 - Oct. 7	Review for Exam I	Makeup Lab (TA Permission Required)
Oct. 11 - Oct. 14	Giant Planets	Jupiter's Moons
Oct. 18 - Oct. 21	Exoplanets	Exoplanets
Oct. 25 - Oct. 28	Light and Spectra	Spectroscopy
Nov. 1 - Nov. 4	Stellar Spectra	Stellar Properties
Nov. 8 - Nov. 11	Stellar Spectra, Parallax	Parallax
Nov. 15 - Nov. 18	Review for Exam II	Makeup Lab (TA Permission Required)
Nov. 22 - Nov. 25	Thanksgiving!	No Lab or Discussion Meetings this week
Nov. 29 - Dec. 2	Galaxies	Galaxy Classification
Dec. 6 - Dec. 9	Cosmology	Hubble's Law
Saturday, Dec. 10	Last chance to ...	Makeup Lab (TA Permission Required)



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ASTR101: General Astronomy

Lab Policies

Purpose of Lab

The ASTR101 Labs are intended to let you work through some key projects that astronomers have done to advance our state of knowledge. In these labs, we will emphasize how observational data can be effectively used to study the Universe. Measurements are never perfect, and this fact leads to real and unavoidable uncertainties in the determination of physical quantities. We hope that lab will help you gain an appreciation for the careful and detailed measurements that scientists make. Lab, like lecture, is not about memorizing miscellaneous astronomical facts. Recurring themes in these labs include i) How do we know how far away and how big things are? ii) How do we find patterns in data? and iii) How do we use these patterns to predict things? We emphasize logical thinking, independent discovery, and teamwork. Labs start close to home in the Solar System and gradually work their way outward to the edge of the Universe, just as lectures do. Sometimes lectures will be a little ahead of labs and sometimes labs will be a little ahead.

Lab Reports

- It is best to read [this week's lab](#) before coming to class.
- For each lab, you will need to write responses into an [ELMS](#) quiz, so **bring a laptop or at least your smartphone to class**. You will typically work together in teams, but your writeups on ELMS must be in your own words. Please identify in your ELMS writeup the people that you worked with.
- Put your cell phones away and keep them off during class, unless using them for the ELMS writeup.
- **All ELMS writeups must be completed in class**. In special situations, with TA permission, labs may be finished outside class.
- Labs material complements lecture material and should therefore help you prepare for ASTR101 Exams.
- Each lab is worth about 75 lab points (= 15 class points).

Missed Labs

- **Try not to miss a lab**, but if you must your lowest lab grade in the semester will be dropped.
- If you must miss your lab and want the chance to make it up, you must contact your TA by email **before your lab meets**.
- If you contact your TA by email within 24 hours after missing a lab, you will need to explain the reason for your delay.
- If you fail to contact your TA by 24 hours after a missed class, **your absence is automatically unexcused**.
- You each start the semester with **one free pass** that can be used to excuse an absence in lab or discussion section for any reason, as long as you let your TA know of your absence in advance. This pass may be used any time during the semester.
- The university recognizes these excuses for missing class: religious holidays, university-approved travel or activities, illness, and compelling circumstances beyond your control. These excuses do not require your free pass.

- Compelling circumstances include, for example, car trouble or a death in the family. Your TA will decide on other situations and will let you know whether you can or cannot make up lab.
- If your TA approves your excuse, you will be able to make up lab during the week of the next Exam.
- Your TA will let you know exactly when the makeup session will be; it may be at a non-standard time.
- **An unexcused absence for a Lab result in a zero.**



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